

YIN AND YANG: THE RELATIONSHIP OF JOINT VISION 2010'S CONCEPTS OF DOMINANT MANEUVER AND PRECISION ENGAGEMENT

**A MONOGRAPH
BY
Major William D. Wunderle
Infantry**



19981207 043

**School of Advanced Military Studies
United States Army Command and General Staff
College
Fort Leavenworth, Kansas**

Second Term AY 97-98

Approved for Public Release Distribution is Unlimited

**Reproduced From
Best Available Copy**

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 21 May 1998		3. REPORT TYPE AND DATES COVERED Monograph	
4. TITLE AND SUBTITLE YIN AND YANG: The Relationship of Joint Vision 2010's CONCEPTS OF DOMINANT MANEUVER AND PRECISION ENGAGEMENT				5. FUNDING NUMBERS	
6. AUTHOR(S) MAJOR WILLIAM D. WUNDERLE					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) School of Advanced Military Studies Command and General Staff College Fort Leavenworth, Kansas 66027				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Command and General Staff College Fort Leavenworth, Kansas 66027				10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES					
12a. DISTRIBUTION / AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE DISTRIBUTION UNLIMITED.				12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) SEE ATTACHED					
14. SUBJECT TERMS MANEUVER WARFARE, DOMINANT MANEUVER, PRECISION ENGAGEMENT, ATTRITION WARFARE, JOINT VISION 2010, DISLOCATION THEORY				15. NUMBER OF PAGES 62	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT UNLIMITED		

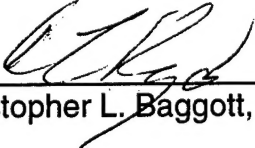
SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

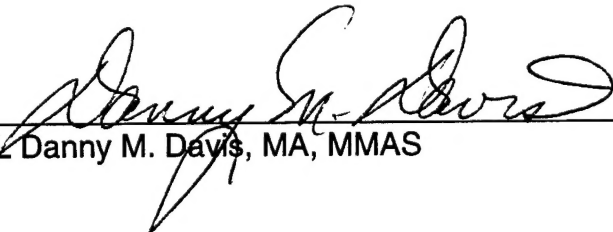
Major William D. Wunderle

Title of Monograph: *Yin and Yang: The Relationship of Joint Vision 2010's,
Concepts of Dominant Maneuver and Precision Engagement*

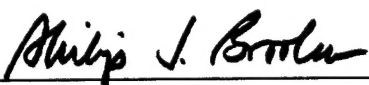
Approved by:



LTC(P) Christopher L. Baggott, MA, MMAS Monograph Director



COL Danny M. Davis, MA, MMAS Director, School of Advanced
Military Studies



Philip J. Brookes, Ph.D. Director, Graduate Degree
Program

Accepted this 21st Day of May 1998

Abstract

YIN AND YANG: THE RELATIONSHIP OF JOINT VISION 2010'S CONCEPTS OF DOMINANT MANEUVER AND PRECISION ENGAGEMENT by Major William D. Wunderle, 51 pages.

Throughout the history of warfare, there have been periods when technological developments have dramatically affected the balance between firepower and maneuver on the battlefield. When the new technology enhanced the effectiveness of firepower, the forces with this advantage tended to reexamine their military's doctrine and procedures to optimize the new technology. To this end, these military forces developed tactics that would focus on firepower over maneuver to gain battlefield victories.

This debate is ongoing as the U.S. military moves into the 21st Century. As in the past, current technological developments tempt us with the prospect that precision engagement or dominant maneuver can eliminate the need for the other. This monograph will examine Joint Vision 2010's emerging concepts and answer the question: *What relationship exists between the operational concepts dominant maneuver and precision engagement; and what relevance will each have in future U.S. military practice?* Additionally, the study examines the roots of modern U.S. firepower and maneuver theory; determines how precision engagement and dominant maneuver differ from the past; and, lastly, determines if dominant maneuver or precision engagement can exist exclusive of the other.

The study concludes that dominant maneuver and precision engagement are not separate concepts, but mutually supporting elements of the same operational concept. Dominant maneuver is the overarching operational concept and precision engagement provides the "technical" means to enable the desired end-state. What matters is not the means used to defeat enemy, but the desired effects.

While the U.S. military should certainly continue to leverage all technology that contributes to decisive victory, the strength of a military's combat power lies in a balance of capabilities, not a preponderance of one. As Clausewitz noted, "an army composed simply of artillery... would be absurd in war." Dominant maneuver and precision engagement must continue to complement one another for the U.S. armed forces to win on the future battlefield.

Table of Contents

I. INTRODUCTION	1
PROBLEM, SIGNIFICANCE, AND BACKGROUND	1
METHODOLOGY	2
II. THEORY OF WAR	5
METHODS OF WARFARE: THE ROOTS OF MANEUVER AND ATTRITION	6
ATTRITION WARFARE	8
RELATIONAL MANEUVER	10
III. HISTORICAL PERSPECTIVES	13
THE AGE OF MOLTKE AND THE EVOLUTION OF MANEUVER	13
THE ASCENDANCY OF FIREPOWER	19
BLITZKRIEG	24
IV. CONTEMPORARY MANEUVER WARFARE THEORY	32
DEFINITION	32
AIMS	32
VITAL ELEMENTS	34
MEANS OF DEFEAT: THE THEORY OF DISLOCATION	38
IMPLICATIONS FOR THE FUTURE	41
V. THE FUTURE: JOINT VISION 2010	43
DOMINANT MANEUVER	43
PRECISION ENGAGEMENT	44
VULNERABILITIES	45
CONTESTED TERRITORY	47
STRATEGIC BALANCE	48
VI. CONCLUSION	49
ENDNOTES	52
BIBLIOGRAPHY	58

I. Introduction

*"We are way too conservative in the way we intend to fight future warfare."*¹

LTC Robert Leonhard

The U.S. Army's current field manual on operations defines maneuver as "the movement of combat forces to gain positional advantage, usually in order to deliver, or threaten delivery of, direct and indirect fire." This same manual describes firepower as "the amount of fire that may be delivered by a position, unit or weapons system...to destroy the enemy."² Throughout the history of warfare, there have been periods when technological developments have dramatically affected the balance between firepower and maneuver on the battlefield. When the new technology enhanced the effectiveness of firepower, the forces with this advantage tended to reexamine their military's doctrine and procedures to optimize the new technology. To this end, these military forces developed tactics that would focus on firepower over maneuver to gain battlefield victories.

Problem, Significance, and Background

This debate is ongoing as the U.S. military moves into the 21st Century, albeit the term's firepower and maneuver have evolved to precision engagement and dominant maneuver. In the Chairman, Joint Chiefs of Staff's vision for the armed forces, *Joint Vision 2010*, and *The Concept for Future Joint Operations*, the concepts of precision engagement and dominant maneuver are fundamental to future military operations. Along with full dimensional protection and focused logistics, these concepts will contribute to America's ability to dominate opponents across the spectrum of military

operations.

As in the past, current technological developments tempt us with the prospect that either precision engagement or dominant maneuver can eliminate the need for the other. *This monograph will examine Joint Vision 2010's concepts of dominant maneuver and precision engagement to determine what, if any, relationship exists between these two operational concepts, and the relevance each may have in future U.S. military practice.* The secondary questions', that guide this study, will identify the roots of modern U.S. firepower and maneuver theory and determine how precision engagement and dominant maneuver differ from the past. Lastly, assuming that both concepts depend on decisive control of the breadth, depth, and height of the battle space and focus on a desired effect or accomplishment of an objective, this monograph will determine if dominant maneuver or precision engagement can exist exclusive of the other?

Methodology

The U.S. military use of maneuver in the 21st Century will be a function of the method of warfare the military chooses to employ. Employing a particular method of warfare is a conscious decision based on the aims of the conflict and the means available to achieve them. Therefore, an understanding of maneuver and attrition warfare in the past may help determine how the military can apply similar strategies in the future. Chapter 2 will discuss the German historian Hans Delbruck's two methods of war: exhaustion and annihilation, and Edward Luttwak's concepts of attrition and relational maneuver. Although these contrasting methods of warfare share the same means, they markedly differ in their use of ways and ends to be advanced.

In an effort to understand the impact of technology on the modern battlefield and the paradigm shift from firepower to maneuver in the past, Chapter 3 studies the evolution of maneuver by studying the theories of Moltke, and the subsequent ascendancy of firepower as it occurred in World War I. Conversely, the resurgence of maneuver is studied by analyzing the emergence of German infiltration tactics during World War I, which ultimately evolved into the Blitzkrieg or “lightning war” in World War II, and the Soviet theories of “operational deep maneuver” based on similar World War I experiences.

It is anticipated that future maneuver warfare will capitalize on information technologies, and will seek to defeat the enemy by either attacking or threatening a critical vulnerability, rather than his source of strength. To accomplish this, maneuver warfare seeks positional, functional, temporal, and moral dislocation of the enemy. Using these concepts, and analyzing the works of recognized of maneuver warfare theorists, Chapter 4 describes a concept of maneuver that is applicable as the dominant form of warfare for the 21st Century.

The Chairman, Joint Chiefs of Staff’s vision for the armed forces, *Joint Vision 2010*, and the *Concept for Future Joint Operations*, discusses the concept of full spectrum dominance in future warfare. The concepts of precision engagement and dominant maneuver along with full dimensional protection and focused logistics, are the keystone concepts that will contribute to America’s ability to dominate opponents across the spectrum of military operations. Chapter 5 critically analyzes the concepts of dominant maneuver and precision engagement and will serve to highlight selected critical strengths and vulnerabilities of each. Despite the strengths of precision engagement and

dominant maneuver, the vulnerabilities of each may prove to make their use in isolation impractical.

As in the past, recent technological developments tempt us with the prospect that either precision engagement or dominant maneuver can eliminate the need for the other. The ultimate goal in precision engagement is such a precise application of firepower from a safe standoff that friendly losses are zero, collateral damage is naught, and most enemy troops are spared while their equipment is destroyed. Unfortunately, without an obliging enemy, this appears to be an unrealistic scenario. The objective of dominant maneuver is to put the opponent in such an untenable position and so unhinging them psychologically that they are defeated without a shot being fired. Although such cases have occurred in recorded history, instances are rare. While it is certainly desirable and may be possible to win in this way, depending on it to win may prove foolhardy. Additionally, this chapter analyzes these recent arguments by showing that carrying either precision engagement or dominant maneuver warfare to an extreme may create the fallacy of bloodless battlefield. Nearly all past operations have used a mix of attrition and maneuver to achieve success. Military forces have consistently used a combination of annihilation and exhaustion strategies. It is never a decision as simple as the theories imply.³

II. Theory of War

"The political object is the goal, war is the means of reaching it, and the means can never be considered in isolation from their purposes."

Carl von Clausewitz

In his book on warfighting, Lieutenant Colonel H.T. Hayden describes war as "a state of hostilities that exists between or among nations, between a government and its people, or between factions within a nation, characterized by the use of organized, armed force". The essence of which "is a violent clash between two hostile, independent and irreconcilable wills."⁴

How the U.S. military employs its combat power in the 21st Century will be a function of the method of warfare the military chooses to employ. When disagreements between nations cannot be settled through peaceful means, such as diplomacy between nations and the political process within a nation, or economical pressure, the result is war. The military theorist Carl Von Clausewitz defined war "as an act of force to compel the enemy to do our will."⁵ . Thus, the object in war is to force the enemy to accept our will. The means to that end is the organized application or threat of violence by military force.

For a nation to impose its will on an enemy, two things must be present: The means and the national will to employ the means against the enemy. A generally accepted formula for the ability of a nation to apply force in the pursuit of national objectives is as follows:

$$\text{Force} = \text{Means} \times \text{Will.}$$

National will includes not only the desire to use the means, but the ability, purpose and direction to use the means to enable the use of force. Without the ability to

translate desire into action, will is not relevant. This formula implies that if we wish to compel an intractable adversary to do our will we must reduce his ability to resist – generate force – by attacking his means, his will, or his leadership (which applies direction, purpose and motivation). Without means the enemy must do what we demand or face destruction, and without the will to use his means to resist the enemy must submit. By significantly reducing an enemy's means, or will, the U.S. military can more easily achieve its objectives.⁶ Based on the political situation employing a particular method of warfare will be a conscious decision based on the strategic aims of the conflict and the means available to achieve them.

Methods of Warfare: The Roots of Maneuver and Attrition

The German military historian Hans Delbruck defined two basic forms of warfare: The strategy of annihilation (*niederwerfungsstrategie*) and the strategy of exhaustion (*ermattungsstrategie*). Both strategies use maneuver differently. The sole aim of annihilation is the decisive battle, and focuses on the total destruction of the enemy armed forces. The strategy of exhaustion, which Delbruck also called the two-pole strategy, uses both battle and maneuver to attain its aim. In the exhaustion strategy, decisive battle is no longer the sole aim. Instead, battle is merely one of several equally effective means of achieving the political objective of war. The commander employing an exhaustion strategy must know when to fight and when to maneuver. He must choose when to “obey the law of daring and when to obey the law of economy of forces.”⁷ The strategy of exhaustion compels a commander to seek battle only after considering the aim of war, the potential political repercussions, the type of enemy he is facing and the

response of his nation to victory or defeat. Success is determined by the aggregate of effects over time. Delbruck makes it clear that neither of these two forms are a variation of the other, nor is one superior to the other.⁸ Although these two methods of war still exist today, a narrower definition of these strategies may have more utility for the U.S. military.

Edward Luttwak defines these two opposing methods of warfare as attrition warfare and relational warfare⁹. Both emphasize two distinct approaches to warfare and two different purposes for maneuver. Attrition warfare is based on the destruction brought about by firepower. Fires are the principal means for destroying the enemy. In attrition warfare, maneuver is merely the means to deliver those fires. In contrast, relational maneuver is based on movement. The aim of relational maneuver is to shatter the enemy's moral and physical cohesion through superior maneuver. Understanding the difference between these opposing strategies of warfare is critical to developing future warfare concepts. Figure 1 is an attempt to visualize the previously discussed formula of war, and shows the opposing strategies which are used to compel the enemy to do our will.

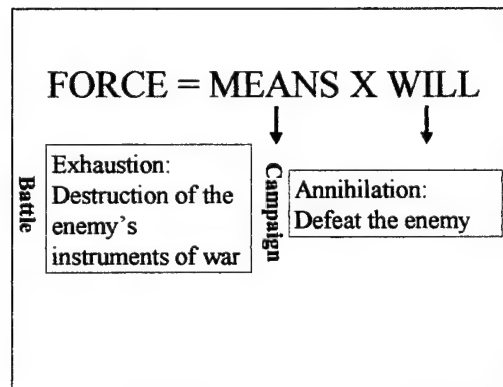


Figure 1. Formula and Strategies of War

Although few armies use either method of warfare exclusively, new and emerging technology is rapidly improving the U.S. military's capability to conduct both in ways that were heretofore unthinkable. As the military continues to define its future, it will ultimately choose a preferred method of warfare somewhere along the spectrum between attrition and relational maneuver. The choice the U.S. military makes will define its mix of attritional and relational maneuver, and in turn the role and purpose of maneuver. An understanding of maneuver and attrition warfare in the past can help determine how the U.S. military may apply these strategies in the future. Because the choices between these methods of warfare will significantly influence future strategy, a more detailed analysis of each is necessary.¹⁰

Attrition Warfare

Attrition warfare seeks victory through the destruction of the enemy's material assets (men and equipment). The attritionist uses firepower to systematically destroy enemy targets and exact as great a toll as possible. Success is to be obtained by the cumulative effect of superior firepower and material strength.¹¹ The emphasis is on the efficient application of firepower and is nearly a scientific approach to war. Effectiveness is measured quantifiably through battle damage assessments, body counts, and captured terrain. In attrition warfare "victory is mathematically assured."¹² Force ratios between friendly and enemy forces also play an important role. Attrition warfare demands a willingness to be attrited. Therefore, favorable ratios mean a battle becomes acceptable based on the ratio of friendly to enemy losses. In attrition warfare it is understood that the reciprocal attrition by the enemy on friendly forces will have to be

absorbed. There can be no victory in this method of warfare without an overall numerical superiority. In attrition warfare there can be no cheap victories. Both sides pay costs in casualties and material in proportion to the enemy's strength.¹³ Attrition warfare seeks victory by destroying, if necessary, every physical thing an enemy can use to continue the war. If the enemy capitulates before they are completely destroyed so much the better. Attrition warfare is straightforward, bull-headed warfare. Although attrition warfare does not exist in pure form, examples of warfare that were attrition-oriented include the trench fighting of WWI, and the Luftwaffe's attempt to defeat the Royal Air Force in 1940 by deliberately seeking air-combat engagements.¹⁴ The decision to implement attrition warfare minimizes the risks of losing, and the objectives are clear. However, the costs of attritional warfare can be high and the ultimate end-state is often predictable.

The problem with destruction oriented warfare is that destruction by itself is often inconclusive. Once a bomb is dropped or a rocket detonated, the effect is over. The effects of firepower are often transient against a strong-willed enemy who will fight long after his war materials are gone. Destroying an enemy's material assets is often a very indirect and costly approach to defeating an enemy's fighting spirit. Although some would say the continuous bombing of Britain by the German Luftwaffe in the autumn of 1940 stopped too soon, this strategy did not conquer Britain. Firepower and destruction alone were not enough to break the will of the British people.

Nevertheless, technological advancements in firepower often rekindle the idea of destruction as the most effective way to win a war. In 1921, as airpower was growing in importance, Giulio Douhet (a classic attritionist), articulated an argument that has never completely died. Making little room for exception, he wrote that to "conquer the air

means victory; to be beaten in the air means defeat....”¹⁵ From this axiom he drew his first corollary: command of the air is necessary – and sufficient – to assure an adequate national defense.¹⁶ In other words, all that is really needed in war is a dominant air force.

Douhet believed, like many of his contemporaries, that the enemy could be physically beaten into surrender. The bomber dropping massive firepower was enough to win. Their theory was as much about the effects of firepower as it was about the importance of airpower. Although Douhet’s airpower theory has lost credibility with time, his ideas on the utility of massive destruction to win a war continue to linger.

That destructive firepower alone is seldom enough to cause an enemy to surrender is well documented through out history. Accounts of soldiers still fighting on despite devastating attacks from airpower and artillery remind us that the psychological dimensions of warfare demand more than better weapons. The action of a single arm may result in nothing more than partial success; proving that combined arms remains essential for a complete and defined result.¹⁷ To increase effectiveness, firepower must be combined with maneuver. With superior maneuver opportunities and weaknesses are created that attacks the enemy’s will directly. Maneuver combined with firepower, or the threat of firepower, present a dilemma to the enemy that forces him to either fight at a disadvantage or surrender. The effects of maneuver take away the ability of an enemy to persist.¹⁸

Relational Maneuver

In his book *Strategy: The Logic of War and Peace*, Edward Luttwak describes the difference between relational maneuver and attrition warfare as the manner in which

maneuver is used. In attrition warfare, maneuver is used to seize a position from which fires can be placed on the enemy. Maneuver warfare, however, applies maneuver to create enemy weakness. Instead of seeking out the enemy's concentrations (since that is where the targets are most present), relational maneuver begins by avoiding the enemy strengths, followed by the application of some selective superiority against a presumed enemy weakness. The enemy weakness may be physical, psychological, technical, or organizational.¹⁹

The goal of relational maneuver is to rely on mobility and surprise to attack through enemy weaknesses with strength against an identifiable enemy vulnerability. Maneuver is not tied to fires, but to gaining a physical or psychological advantage over the enemy. Relational maneuver uses maneuver to defeat the enemy by means other than simple destruction. Preemption of enemy intentions is the key to relational maneuver success. A force employing relational maneuver measures success by the degree to which the enemy's cohesion, organization, command, and physical balance is shattered. The aim is to render the enemy incapable of fighting as a coordinated, effective whole. "The results of relational maneuver depend on the accuracy with which enemy [vulnerabilities and] weaknesses are identified, the surprise achieved, and the speed and precision of the action."²⁰ Combinations of speed and surprise are preconditions for successful maneuver.

Firepower, however, is as essential to successful relational maneuver as it is to attrition warfare. How firepower is applied in maneuver warfare differs from attrition warfare. Relational uses fires selectively in order to enable maneuver. Focused firepower facilitates the tempo necessary to dislocate and surprise enemy forces. As it

supports the larger scheme, firepower is employed to suppress and destroy enemy forces. Firepower and maneuver are inseparable and complimentary dynamics of combat.²¹

A final characteristic that separates attrition warfare from relational maneuver is risk. Attrition warfare is inherently less risky than relational maneuver. Although attrition warfare can succeed only cumulatively against an enemy, if it is unsuccessful it “fails gracefully.”²² Because each error in attrition warfare is matched by only a proportionate penalty, catastrophic failure is unlikely. Relational maneuver, although riskier, offers the possibility of results disproportionately greater than the resources applied to the effort.²³ The risk of relational maneuver is that it can fail completely if the selective strength that is narrowly applied against the enemy vulnerability fails. Failure can result from either using an inadequate force or because the enemy was not as weak as presumed. In essence, the substantial advantages of relational maneuver depend heavily on accurate information about the enemy and the speed of the combat element that moves to exploit that information. The more that is known about the enemy, the less risky the maneuver. As will be shown later, it is the recent advances in information technology that will contribute directly to reducing the risk and enabling dominant maneuver in the 21st Century.

Delbruck’s theory did more than define two strategies. He showed that historically there could be no single method of war correct for every age. Like all aspects of warfare, strategies are intimately connected with national interests, resources, politics, the people, and the times in which they occur.²⁴ Delbruck’s theory serves as a useful reminder that militaries must continuously examine the correctness of their strategy based not only on the capabilities and limitations of the enemy, but their own as well.

III. Historical Perspectives

"Positions are seldom lost because they have been destroyed, but almost invariably because the leader has decided in his own mind that the position cannot be held."

A. A. Vandegrift

The Age of Moltke and the Evolution of Maneuver

Against the Austrians at Koniggratz in July 1866, during the Austro-Prussian War,²⁵ the Prussian army demonstrated its superiority over other European powers. Having studied Napoleon extensively, the Prussians recognized the impact of the nation-in-arms and new technologies on warfare. However, the Austro-Prussian war was not just a demonstration of larger armies and technological improvements. It represented how the Prussians had effectively applied these advances through operational and organizational changes to transition to new methods of warfare in the achievement of national objectives.²⁶

The architect of this evolution in warfare was the Prussian Chief of Staff, Helmuth von Moltke. Moltke named chief of the Prussian General Staff in 1857 believed that railways could play a significant role in troop and supply transport. He also understood that with the railroads replacing horses, a completely new type of leadership had to be developed. With commanders directing troop movements from railway hubs rather than at the scene of action, their subordinates would have to use their own judgement in how to best carry out their orders. While Moltke believed the railroad enhanced the strategic offensive, he thought advances rifle and artillery technology made the tactical defense superior, he saw the beginnings of what would become known as

operational art. The key to Prussian victory was their effective integration and synchronization of the mobilization, deployment, and employment of their forces. Simply stated, they achieved superiority in strategic mobility and operational maneuver.²⁷

Prior to 1866, Moltke recognized that improved firearms, transportation, and communications, combined with the ability of nations to raise and maintain larger armies required changes in strategy, tactics, command, and organization.²⁸ Using the railroad to deploy the armies over a broad front, the Prussians achieved an acknowledged superiority in mobilization and deployment. The results were a spatially expanded theater and a significant reduction of the time required for mobilization and deployment.²⁹ The genesis for this superiority was Moltke's concept of "one continuous strategic-operational sequence combining mobilization, concentration, movement, and fighting."³⁰

Prussia created a military system that could achieve their national objectives through improved mobilization. The Prussian mobilization set the stage for the outcome of the Austro-Prussian war. First, The Prussians rigorously applied a system of military conscription. Michael Howard described this system of compulsory service as, "the foundation for Prussian military effectiveness."³¹ After serving three years on active duty, these trained soldiers spent four additional years with the reserve and then they were transformed were transferred into the Landwehr. A conscript served all three phases of his military obligation within a regionally based army corps. This regionally based system increased greatly the speed and efficiency of mobilization.³² This gave the Prussians a decisive advantage in time.

The Austrians on the other hand had significant problems during mobilization. Lacking a well-developed system of railroads and facing a war on two fronts; Bohemia

and Italy; the Austrians had to mobilize early in the crisis. Even so, the Prussians mobilized nearly the same size force as the Austrians in less than half the time.³³ Given Prussia's smaller overall population compared to the other major powers, they clearly raised the mobilization process to a new level. Other European nations failed to realize, until too late, that the Prussians managed to combine large numbers, speed and quality in their concept of a Nation-in-Arms.³⁴

Once mobilized, the Prussians deployed their forces in two notable ways. Moltke and the General Staff used the railway efficiently to deliver forces to the theater. The Prussians prepared detailed contingency plans. They coordinated effectively the mobilization, and planned the use of the railway and road systems to move forces rapidly to key strategic points.³⁵ Every unit knew its assigned role and assembled at the designated rail station upon a simple notification. In this way, thousands of fully equipped troops moved rapidly to the frontier shortly after notification.³⁶ The Austrian system was greatly inferior and they only had one rail line into theater. The Prussians used five different rail lines to move their forces into theater. Moltke estimated that he could concentrate 285,000 troops in Bohemia in 25 days. Since the Austrians had only one rail line, he knew they needed about 4 days to assemble 200,000.³⁷ Neither the Austrians nor the French achieved even this rate of deployment by rail in 1859.³⁸ The distribution of rail lines provided Moltke with the ability to expand the size of the theater and the major southern approaches into Prussia.

The deployment advantage meant that Moltke did not have to concentrate his armies until he identified the main avenue of approach of the Austrian army. This advantage allowed Moltke to develop a plan to outflank the Austrians in one continuous

strategic-operational sequence that linked mobilization, deployment and employment of armies together to annihilate the Austrian army.³⁹ This strategy proved that Jomini's principle of interior lines did not always apply. Moltke demonstrated that if you space your armies so the enemy cannot defeat one without being outflanked by the others, then the advantage of interior lines becomes a disadvantage of encirclement.⁴⁰

Moltke's strategy of continuous mobilization, concentration, movement and fighting required new thinking in terms of command and control; centralized planning and decentralized execution. Centralized planning effectively set the military machine in motion and using centralized communications (via the telegraph) while decentralized command and control was necessary at the tactical level for execution. Moltke understood that increasing the size of militaries increased complexity of war. Once the battle began, he realized that subordinate commanders were in the best position to direct the fight.⁴¹

Moltke's perceived inability to command and control the actual employment of forces in combat represented the recognition of the three levels of war: strategic, operational, and tactical. At the strategic level, Moltke's role was to understand the strategic objectives of Prussia then raise, train, and equip the military to achieve those objectives. At the operational level, as theater commander, Moltke sought to develop a campaign plan that used Prussia's strategic assets (the railroad and telegraph) to first deploy and then orchestrate the movement of his armies to defeat the Austrians. However, given the size of the theater of operations and the limitations of the telegraph, Moltke realized that he could not command and control the various battles that would inevitably precede the main engagement with the Austrian army.⁴²

While the railroad and telegraph solved some problems of movement and control, they did not solve all of them. The 1866 campaign revealed that an infantry force deployed by rail had limits. The size of the armies and the more specialized munitions, such as those for the needlegun and the artillery, meant that armies could no longer live almost exclusively off the land. While required supplies could be moved quickly by railroad, once the supplies were loaded on horse-drawn wagon, movement to the front was slow.⁴³ The rate of movement from the railroad and the number of wagons available determined the reasonable distance that an army could move away from the end of the rail line and still receive adequate amounts of supplies to sustain itself. This distance and the number of rail lines into a theater determined the reasonable limits of maneuver. If distances became too great, then the armies could not link up and defeat an opponent who could concentrate his forces.⁴⁴

The battle at Koniggratz represented a turning point in the conduct of warfare. For the first time in centuries, European armies fought with weapons with different capabilities. Moltke recognized the impact of breach-loading rifles and rifled artillery. Frontal attacks and bayonet charges were fruitless against the breach-loading rifle. The Prussian military was superior to the Austrians in all but artillery. The battle was a contest between the Austrian artillery and the Prussian needlegun, each supreme in their own sphere.⁴⁵ While the Austrians had rifled muskets with good range, the needlegun fired almost six times a musket's rate of fire, and it could be fired from the prone, thus presenting a smaller target. The Prussian weakness in this battle was their artillery. Prussian artillery was mainly short-range smoothbore, although they had some new breach loading rifled guns. The Prussians failed to use their artillery effectively. The

Prussians failed to use their artillery in conjunction with infantry fire and maneuver in a combined arms role. The Austrians had rifled guns and used them better in support of infantry.

Several factors led to the Prussian victory at Koniggratz. First, the abilities of the Prussian leadership and general staff exceeded greatly those of her opponent. The industrial revolution was an important contributor the second factor; the ability of the Prussians to mobilize and deployment in a continuous sequence placed the Prussian forces in positions of advantage over the Austrians. Using the railroad and the telegraph, the Prussian mobilized and deployed three armies on separate lines of advance to fix and envelop the Austrians at Koniggratz. Moltke used the speed of the Prussian mobilization and expanded deployment of his forces to achieve a decisive advantage and defeat the Austrians. The key elements to victory were the railroad, the telegraph, and the fact that the Prussian armies remained within the limits of their logistical support. Combined with Moltke's doctrine of encirclement or *kesselschlacht*, it produced the fruits of victory. The third factor was technological; the Prussian infantry used the Dreyse needlegun, a breach-loading rifle that gave them a six shot to one advantage. Had Austria won at Koniggratz the strategic and operational superiority of the Prussians would not have mattered. So, while tactical parity may have existed, Prussian advantages at the strategic and operational level negated it.

Arguably, Moltke demonstrated the beginnings of operational art at Koniggratz. He planned a campaign that linked strategic objectives and mobilization with operational maneuver and tactical battles to achieve victory. Like Napoleon at Ulm, the Prussians used new methods while their opponents remained entrenched in the old ways. This gave

the victors a decisive advantage. Moltke like Napoleon fought essentially a battle of annihilation. However, the changes in warfare brought about by the industrial revolution allowed Moltke to violate Jomini's principle of interior lines. The Prussians were able to mobilize large forces in a short period of time over a greatly expanded area. This allowed the Prussians to deploy on a broad front to protect the approaches to Prussia. The armies maneuvered and fought separate battles until they finally converged at Koniggratz. This distributed maneuver also played an important role in 1870 against the French when Chancellor Bismark provoked France into the Franco-German War. Moltke's stratagems resulted in German victory and the fall of the French Second Empire.⁴⁶

In the wars of German unification, Moltke sought to encircle his opponent through strategic movement and operational maneuver. Then using the superiority of the defense, he planned to destroy his opponents as they attempted to break out. This approach became known as Kesselschlacht.⁴⁷ Alfred von Schlieffen, Moltke's successor sought to perfect the Kesselschlacht strategy to rapidly defeat the French thus allowing the German Army to focus on the Eastern Front.

The Ascendancy of Firepower

When WWI erupted in 1914, the Germans failed to achieve the rapid decision envisioned by Schlieffen. The movement of their armies could not be sustained.⁴⁸ Schlieffen's plan required the army to conduct strategic marches that dwarfed those of Moltke.⁴⁹ Although he understood the immense logistics burden associated with such an ambitious concept, the sustainment and movement problems went unresolved. As the

rate of the German advance slowed, it cost precious time that allowed the French and British forces to reposition.

For a while, the western allies and Germans continued to attempt traditional maneuver warfare to gain a tactical advantage. Yet as both sides repeatedly tried to attack the existing open flank of the trenches, the forces collided and ended up in a new stretch of trench line, until eventually there were no more flanks. Both sides had determined quickly that the only way to survive was to go below ground. It became clear that this was to be a war dominated by the defense.⁵⁰

This continuous front meant that the only type of maneuver form available was a frontal attack that relied on the increased firepower of massed artillery to penetrate the enemy's trench line.⁵¹ However, these tactics were largely ineffective and tended to be costly to the soldiers involved. Field Marshall Sir William Robertson, Chief of the British Expeditionary Force, described the problem with these tactics:

The Main lesson of these attacks are that given adequate artillery preparation... there is no insuperable difficulty in overwhelming the enemy's troops in the front line and in support, but that there is the greatest difficulty in defeating the enemy's reserves which have not been subjected to the strain of a long bombardment...⁵²

By 1916, the creeping or rolling barrage emerged. It called for a wall of artillery fires to move just ahead of the advancing infantry and then lift at regular intervals to allow the troops to move forward.⁵³ The intent of this technique was to destroy or neutralize the enemy forces until the infantry could close within direct fire range for their assault. The "object of the artillery barrage [was] to prevent the enemy from manning his parapets and installing his machine guns in time to arrest [the] infantry."⁵⁴ However, this

technique proved to have an unintended effect.

Instead of facilitating a return to maneuver warfare, the infantry became too reliant on the artillery. The participants of the war “became increasingly addicted to the powerful drug of more and more artillery, and the guns came to dominate the battlefield as never before in history.”⁵⁵ As both sides came to depend on their heavy howitzer, it naturally became more important to improve counterbattery operations to destroy the enemy guns. Indeed, this rose to such importance that some viewed counterbattery action as the “essential mission of the artillery and the enemy gun [as] the most redoubtable adversary.”⁵⁶ To successfully execute this mission, artillerymen needed to improve their deep fire capabilities in several key areas: detection and observation of the deep enemy batteries, communications between the observer and the commander of the guns and the accuracy and responsiveness of the guns themselves.

Technology provided the answer to the detection problem when the British successfully used the airplane in this capacity. The aerial observer actually did more than just detect the enemy. He also communicated with the guns, watched the impact of the rounds and gave corrections to the firing battery.⁵⁷ However, a major limiting factor to the successes of aerial observation was poor visibility caused by bad weather or smoke on the battlefield. Additionally, the guns became dependant on these aerial observers so much that when “bad visibility prevented any such calls being received, the gunners felt as though their eyes had been put out.”⁵⁸ Despite these problems, aerial observation had become the most effective method for detecting enemy targets deep behind the front line of troops.

While the airplane provided an answer to the observer dilemma, it quickly

became clear to commanders that these new artillery tactics “depended above all other considerations on good communications between guns, commanders and observers.”⁵⁹ Communications by wire had proved to be unreliable during this war, since enemy artillery impacts tended to cut the necessary wires regardless of the depth to which they were buried. Again, technology became available to resolve the problem in the form of new “wireless” communications. Very rapidly, reports from aircraft using wireless became an essential element in artillery programs.⁶⁰

Even though wireless communication was the answer to this requirement, it generated problems of its own. This new ability was vulnerable to enemy eavesdropping, interception, and jamming. A relatively simple answer emerged when both sides began to encrypt their radio transmissions. The radio had arrived as an integral part of fire support communications on the battlefield.

While the communications between the observer and the guns was the critical element if the deep fires were to succeed, the fire mission would still fail if the guns could not deliver rapid and accurate fires on the target.

The Accuracy of the fires depended on two critical variables: the correct locations of the enemy and of the firing battery on the map. If either of these were incorrect, the rounds would not hit the target. Earlier in the war, the guns had fired registration rounds from which they could adjust. However, this alerted the enemy to incoming artillery and surprise was lost. The solution to this problem was the artillery survey, which was a method of fixing and recording the relative direction and distance of two points in three dimensions. The purpose of this survey was to develop an artillery map from which bearings could be measured accurately. This was essential for indirect fires when the

target was only reported as a location on a map.⁶¹ Ground forces were now capable of massing the effects of firepower without physically massing weapons systems. Furthermore, this ability to disperse the guns reduced their vulnerability to enemy counterbattery fires.

By the end of this Great War, the improvements in the delivery of indirect fires were significant. Armies were capable of delivering accurate long-range indirect fires to destroy or neutralize enemy forces throughout the depth of the battlefield. However, this overwhelming volume of artillery alone was not decisive.

The military and civilian leaders of both sides struggled with various tactics to overcome the superior firepower and to break the bloody stalemate. Yet, all of these solutions had been based on firepower, specifically indirect artillery fires. Indeed, Colonel George Bruchmuller of the German army admitted that, although massed artillery had served the Germans well, they eventually viewed firepower as the problem itself.⁶² Mobility, in conjunction with firepower, was necessary to successfully conduct the offensive operations that are critical to victory.

It would take another technological breakthrough to give the armies a viable method of taking the offensive and effectively maneuvering against the enemy. In 1916, “the tank clanked suddenly onto the battlefield and into the nightmares of every infantryman.”⁶³ While the first use of the tank in combat was not truly successful, it provided a glimpse of the next generation of technology that could respond to counter the dominance of firepower. In November 1917, nearly 400 British tanks attacked the German defenses of Cambrai. After initial success, German counterattacks negated most of the gains won by the British. However, “the tank attack at Cambrai cannot be

measured by the raw statistics of yards gained or lost. It marked the start of a revolution in warfare... the tank restored decisive power [of maneuver] to the offensive."⁶⁴

The brief ascendancy of firepower in World War I had ended. The combatants had tried focusing artillery firepower at the point of penetration to open a hole in the enemy defenses. This failed because the enemy forces could merely array forces in depth, then employ reserves to prevent the attackers from exploiting the effects of firepower. Later, they used artillery fires on deep missions in an attempt to defeat enemy forces, primarily other artillery batteries, in the enemy rear. Advancements in observation, communication and precision of the firing guns contributed to the success of these missions. However, ground forces could still not move forward to occupy ground or defeat the enemy in close combat. Artillery fires were not successful in defeating the enemy forces. Indeed, the effects of artillery fires often prevented rapid movement. The guns destroyed much equipment and killed many soldiers, but did not produce a victory. When this improved firepower was married again to maneuver, with the tank and the airplane, offensive operations were once again able to drive back the defenders.

Blitzkrieg

The German army in 1940 represents another stage in the evolution of maneuver in warfare. German military thought between the world wars focused almost entirely on the problem of restoring the operational freedom that they were unable to achieve in WWI. The Germans viewed WWI as a national failure, not a military one, especially at the tactical level. In 1918, the Germans published a new warfighting manual entitled, *The Attack in Positional Warfare*.⁶⁵ The manual prescribed methods to penetrate enemy

defenses and methods to turn that penetration into a strategic breakthrough. These infiltration tactics emphasized a combined arms attack with close cooperation between infantry and artillery. Although the German offensives of 1918 used these infiltration tactics and achieved success, the German army was exhausted by August 1918.⁶⁶ Thus, the ideal of Kesselschlacht remained unaltered. The question was how to gain the freedom of movement necessary to carry it out.⁶⁷ After the war, the combination of Kesselschlacht and infiltration tactics serves as the genesis of what came to be known as Blitzkrieg.⁶⁸

The years between the two world wars saw further development of motorization and mechanization in most armies. However, the operational and organizational approaches taken by the various nations in response to similar technologies differed greatly. Germany was an advocate of the offense, while France opted for the defense. The results gave Germany the initiative, which would lead to decisive victory.

The effects of German national policy on their military doctrine were both simple and complex. At the simplest level, Germany still faced the threat of a two front war. Even though Germany had a treaty with Russia, many did not believe it would last. The threat of a two-front war contributed to an offensive strategy. The Treaty of Versailles denied German tanks, aircraft, and fixed field fortifications and limited the size of her navy. Freed from outdated weapons from WWI, and without fortifications, Germany had to adopt at least a mobile defense strategy if not an all out offensive one. Reductions forced by the Treaty of Versailles allowed Germany to develop an elite pool of military professionals.⁶⁹ These factors, and others, combined to create the offensive strategy. Finally, Hitler simply wanted war. Matthew Cooper, in his study of the German Army

summed up the National Socialist general strategy in three words: Grossdeutschland, Lebensraum, and Weltmacht.⁷⁰ Therefore, while these factors pointed toward an offensive strategy, only the combination of the two turned it into reality. What Hitler wanted, the military promised to deliver. For various political reasons, France adopted a defensive strategy against Germany. In his study of the interwar years, Robert Doughty pointed out various reasons for France's defensive strategy. First, France believed it could not win a war quickly with Germany. Their perceived lessons from WWI remained vivid. Second, France lost the Franco-Prussian war with a professional army. They won WWI with a return to the nation-in-arms.⁷¹ Third, France lost a greater percentage of the population in WWI. This resulted in low birthrates and forced France to pass laws in 1927 and 1928 that called for a lower rate of conscription. This created a situation whereby France could not adequately defend itself without mobilization.⁷²

On March 16, 1935, Hitler denounced the Treaty of Versailles and began to fully rearm the Wehrmacht.⁷³ Technological advances that saw limited use during WWI, became the mainstays of WWII. These included the tank, improved artillery, air defense weapons like the famous German 88-millimeter, and fighter and bomber aircraft. These systems influenced doctrine and organizational designs. The wireless radio was a major advance in communications. The Germans incorporated the new radios into their tanks with great results.

During the interwar years, each military struggled to determine the best way to overcome the stalemate of the western front. Again, national objectives and their individual lessons learned from history influenced the doctrinal development process as much as technology did. Arguably, each country had access to the same new weapons.

The French reverted back to their theory of the primacy of the defense and built the Maginot Line. The German success of the WWI penetration and breakthrough tactics, or infiltration tactics reaffirmed the viability of the offense, therefore their tactical development began with the premise that infiltration tactics worked. Thus Germany created a method of warfare, which combined the use of armor, infantry, artillery, and tactical air support, into a self-supporting structure called the panzer division. By 1937, they formed panzer corps with one motorized and one panzer division. They enhanced their command and control system with a better communications system, in the form of mounted radios. This combination enabled the Panzer division to conduct the penetration and breakthrough operations that characterized blitzkrieg. However, the bulk of the army was still infantry. The German Army used the Spanish Civil War (1936-38) as a testing ground for Blitzkrieg tactics, which proved to be a formidable combination of land and air action. In September of 1939, Germany invaded Poland using the Wehrmacht working with the close support of the Luftwaffe to breakthrough and penetrate deep behind Polish lines of defense.

In his book *Blitzkrieg*, Ken Deighton states that the concept of Blitzkrieg originated in the flank attack of Moltke, and the encirclement theories of Schlieffen.⁷⁴ However, an evolution of the ideologies of Moltke and Schlieffen began to occur. Their strategies sought the annihilation of the enemy. The new strategy was based loosely on the penetration and breakthrough: a strategy of the indirect approach.⁷⁵ While both strategies sought decisive maneuver, the methods differed dramatically.⁷⁶ The German General Heinz Guderian called this new strategy the “armored idea.” Cooper describes the difference between these two strategies as follows:

Physical destruction in one was supplanted by paralysis in the other as the primary aim; well-coordinated flanking and encirclement movements were replaced by unsupported thrust deep into the enemy's rear areas as the method; guarded flanks and unbroken, if strained, supply lines gave it velocity as unpredictability as the basic rules of operation; centralization of control was superseded by independence of action as the first condition of command; and the mass infantry armies, whether or not supported by tanks and aircraft, made way for the relatively small powerhouses of the armored divisions as the primary instrument of victory.⁷⁷

These differences caused a rift between the more traditional officers and the revolutionaries like Guderian and Rommel. The rift continued throughout the war.

One of the lessons that Germany thought it learned after their failure to envelop the French in WWI was that they had simply pushed the army beyond its logistical, movement, and endurance limits.⁷⁸ These logistical challenges plagued the Wehrmacht despite their victory over Poland. Van Creveld cites several reasons for these shortcomings. First, the railroads that in many ways made warfare on this scale possible were strategic assets. They deposited material at the depots. Tactical units transported them to the front lines. Of the 103 divisions available for Poland, only 16 had motor transport. The tactical logistics hauler remained primarily the horse.⁷⁹ This meant that the Germans could not easily sustain a deep armor penetration.

The German resolution to the conflict between the armored idea and a strategy of annihilation determined the initial war plans for the invasions of both Poland and France. Cooper argues that the invasion of Poland remained a strategy of annihilation. The original plan, Operation Yellow, dated 19 October 1939 called for the invasion of Holland, Belgium, and northern France for limited territorial objectives, similar to the original Schlieffen plan.⁸⁰ However the armored idea lived still in Guderian and others, including General Erich von Manstein. Manstein learned of Operation Yellow after it

had been changed to essentially a frontal attack into Belgium. General's Manstein and von Rundstedt argued that the plan lacked the ingredients for decisive victory. They recommended moving the main effort south into their area to form a surprise attack through the Ardennes and cut all the way across France to the coast. Of course, this also meant that von Rundstedt gained command of the majority of the German armor.⁸¹ Eventually, Hitler approved a version of Manstein's plan. However, this plan failed to represent Guderian's armored idea. The decisive maneuver, nevertheless, resulted in the destruction of the enemy.⁸²

Ironically, soon after Hitler approved the Plan, Manstein took command of an infantry corps. General Sodenstern, a traditionalist, replaced him. Without Manstein, Rundstedt declined to pursue a deep armored penetration as well. Later Guderian, commanding XIX Panzer Corps, proposed an armored attack over the Meuse with the objective of achieving a breakthrough.⁸³ However, once the attack began, the Germans easily crossed the Meuse. Thereafter, Hitler and his high command became worried about the pace of the operation. They feared counterattacks and ordered the attack slowed to allow time to reinforce the flanks. Thus, "...the advance degenerated from the armor enthusiasts' ideal of a swift, deep thrust, ending only with the defeat of the enemy, into a succession of short, sharp jabs, with a pause between each of the regroupings."⁸⁴ The final irony of all this came when the mechanized forces closed on the coast south of Dunkirk. Hitler then gave the ground attack to stop to enable the Luftwaffe to provide ground support to the advancing mechanized formations, although they appeared ill suited for the mission at Dunkirk. Although the Germans still achieved a stunning victory, but it was not the armored idea.

Germany created a new method of warfare prior to WWII. This strategy employed highly mobile mechanized formations supported by a large number of infantry divisions. To facilitate the higher tempo of operations, the Germans enhanced their command and control system with vehicle mounted radios. It was penetration and breakthrough operations conducted by the Panzer division, which characterized Blitzkrieg. Because the French failed to develop an equally effective doctrine, the Germans quickly overran them. Although Germany and France had access to the same technologies, they developed different operational and organizational approaches that resulted from each country's reaction to several national factors present at the time. From October 1940 to March 1941, The Germans conquered the Balkans, and in June 1941, Germany invaded Russia. Blitzkrieg allowed the German Army to reach the outskirts of Moscow in December of 1941. Additionally Erwin Rommel in North Africa (1941-1943) also implemented tactics of Blitzkrieg with great success. Beginning late in 1942, the outnumbered German Army was forced to fight a defensive war and was therefore unable to launch any major offensives with exception of Kursk (June 1943) and Ardennes (December 1944) offensive. Overall, tactics of Blitzkrieg were the main contributor of early German victories (1939-1942).

The Soviets developed a similar theoretical mindset called Deep Operations Theory. Its founder, Marshall Tukachevsky, developed this theory initially as a way to avoid the stalemate of trench warfare. His theories formed the basis for modern Soviet doctrine.⁸⁵ These theories and the resultant doctrines, at least in the Soviet and now Russian case, continue to challenge the theories of Clausewitz and Jomini. Clearly, modern warfare pushes the original intent of the pre-industrial theorists. While these

theories still have value, the U.S. armed forces must put these theories into perspective, the concept of Blitzkrieg and decisive maneuver still form a base for future development of weaponry and the evolution of.

IV. Contemporary Maneuver Warfare Theory

"Battles are won by slaughter and manoeuvre. The greater the general, the more he contributes in manoeuvre, the less he demands in slaughter."

Winston Churchill

Emerging Joint Doctrine is based on rapid, flexible, and opportunistic maneuver. But in order to understand fully maneuver warfare theory, the concept must be clarified. The traditional understanding of maneuver is a spatial one; that is, we maneuver in space to gain a positional advantage. However, in order to maximize the usefulness of maneuver, we must consider maneuver in time as well; that is, we generate a faster operational tempo than the enemy to gain a temporal advantage. It is through maneuver in both dimensions of time and space that an inferior force can achieve decisive superiority at the necessary time and place.

Definition

Maneuver warfare is a fighting philosophy that seeks to defeat the enemy by attacking or threatening his center of gravity and shattering the "enemy's cohesion through a series of rapid, violent, and unexpected actions," which create an uncertain, and "rapidly deteriorating situation with which he cannot cope."⁸⁶

Aims

The aim of maneuver warfare is to render the enemy incapable of resisting by shattering his moral and physical cohesion--his ability to fight as an effective, coordinated whole--rather than to destroy him physically through incremental attrition. Although with attrition warfare victory is mathematically assured, it is generally more

costly and time-consuming. Ideally, the components of the enemy's physical strength that remain are irrelevant because their ability to use them effectively has been paralyzed. Even if an outmaneuvered enemy continues to fight as individuals or small units, the remnants can be destroyed with relative ease because his ability to fight effectively as a force has been eliminated.⁸⁷

This is not to imply that firepower is unimportant. On the contrary, the suppressive effects of firepower are essential to the ability to maneuver. Nor does maneuver warfare imply that the opportunity to physically destroy the enemy will be passed up. Fires and forces will be concentrated at decisive points to destroy enemy elements when the opportunity presents itself and when it fits a larger purpose. But the aim is not an unfocused application of firepower for the purpose of incrementally reducing the enemy's physical strength. Rather, it is the selective application of firepower in support of maneuver to contribute to the enemy's shock and moral disruption. The greatest value of firepower is not physical destruction--the cumulative effects of which are felt only slowly--but the moral dislocation it causes.⁸⁸

If the aim of maneuver warfare is to shatter the enemy's cohesion, the immediate object toward that end is to create a situation in which he cannot function. Maneuver warfare seeks to pose menacing dilemmas in which events happen unexpectedly and faster than the enemy can keep up with them. The enemy must be made to see his situation not only as deteriorating, but deteriorating at an ever-increasing rate. The ultimate goal is panic and paralysis, an enemy who has lost the ability to resist.⁸⁹

Vital Elements

Inherent in maneuver warfare is the requirement for speed to seize the initiative, dictate the terms of combat, and keep the enemy off balance, thereby increasing his friction. Therefore, maneuver warfare strives to concentrate friendly strengths against enemy critical vulnerabilities, striking quickly and boldly where, when, and how it will cause the greatest damage to the enemy's ability to fight. Maneuver warfare is opportunistic, actively seeking signs of weakness, against which all available combat power can be directed. To accomplish this Martin van Creveld asserts that there are six vital elements inherent to maneuver warfare: tempo, Schwerpunkt, surprise, combined arms, flexibility, and decentralized command.⁹⁰

Tempo

The first vital element is tempo. Tempo is not the same as speed; it may have been best defined by Colonel John Boyd, USAF, in his briefing on the "Patterns of Conflict," and can be summarized as follows:

Conflict can be seen as time-competitive observation-orientation-decision-action cycles. Each party to a conflict begins by observing. He observes himself, his physical surroundings and his enemy. On the basis of his observation, he orients, that is to say, he makes a mental image or 'snapshot' of his situation. On the basis of this orientation, he makes a decision. He puts the decision into effect, i.e. he acts. Then because he assumes his action has changed the situation, he observes again, and starts the process anew."⁹¹

Actions follow this cycle, are sometimes called the "Boyd Cycle" or "OODA Loop."

The idea is to get "inside" the loop by transitioning from one mode of action to another faster than the enemy can react. Through the use of greater tempo and velocity, maneuver warfare seeks to establish a pace that the enemy cannot maintain so that with

each action his reactions are increasingly late, until eventually the enemy is overcome by events.

Schwerpunkt

The second vital element in maneuver warfare is Schwerpunkt. Schwerpunkt is a German term commonly defined as the "point of main effort." This point of main effort however does not necessarily refer to a point on a map but refers to where the commander believes he can attack an enemy vulnerability and achieve a decision; this is translated in terms of a unit.⁹² The effort of the unit is then focused at the center of gravity, "sometimes known as hitting the enemy at the right time at the right place with the most force."⁹³ The German commanders used "surfaces and gaps to decide where to place the Schwerpunkt. Instead of expending time and forces attacking strong points (surfaces), commanders searched for weaknesses (gaps) to place Schwerpunkt in a position to achieve operational successes."⁹⁴ This is not always as easy as it seems, a leader who is able to discern this enemy vulnerability is said to have *coup d'oeil*, or the ability to intuitively recognize an enemy vulnerability in "the flash of an eye." The concept of Schwerpunkt is often confused with attacking the enemy where he is strongest or where he is weakest. The former will lead to a clash of strength against strength, attrition warfare, and the latter will lead to attacking dead ends, thus having no decisive effect on the enemy and wasting friendly force resources. The key therefore is to find an enemy critical vulnerability; a spot that is both vital and weakly defended.⁹⁵

Surprise

Surprise is the third vital element of maneuver warfare. We must remember that

we will face a thinking opponent, and can expect him to protect his centers of gravity with every means at his disposal. By studying our enemy we will attempt to appreciate his perceptions. Through deception we will try to shape his expectations. Then we will dislocate them by striking at an unexpected time and place. In order to appear unpredictable, we must avoid set rules and patterns, which inhibit imagination and initiative. In order to appear ambiguous and threatening, we should operate on axes that offer several courses of action, keeping the enemy unclear as to which we will choose.⁹⁶

Combined Arms

The fourth vital element of maneuver warfare is combined arms. Combined arms warfare is the grouping of diverse arms (infantry, armor, artillery, aviation, etc.) to produce a synergistic effect “to confuse, demoralize and destroy the enemy.”⁹⁷ More importantly, in combined arms warfare the strength of each arm is brought to bear to expose an enemy weakness to another. Martin van Creveld likens this concept to the child’s game “rock-scissors-paper.” Here each element of the game is able to beat the one coming after it while itself being vulnerable to the one preceding it. He explains:

...in maneuver warfare, tanks should not be used to smash other tanks—which would merely lead to a head-on clashes and attrition—but enemy artillery. Artillery is powerless against tanks; hence it should be used to combat infantry, which in turn, is powerless against it and if not killed will be forced to take cover. The role of infantry is to neutralize the antitank arm and that of the antitank arm is to deal with tanks.⁹⁸

Maneuver warfare employs combined arms in battle in order to fight the enemy where and when he is weak, and present him with a series of tactical dilemmas (versus problems). The value of combined arms warfare is obtained from the value of its

diversity, not in the correlation of force ratios compared to those of the opponent.

Flexibility

The first four critical elements of maneuver are inherent to the ability of a force to rapidly adapt to uncertain situations. Therefore, the fifth critical element is flexibility.

The U.S. Army's capstone manual *FM 100-5: Operations*, discusses flexibility in terms of detailed planning which enables commanders to shift their point of main effort quickly without losing synchronization.⁹⁹ Unfortunately, FM 100-5 only discusses flexibility in the section dealing with the defense. In maneuver warfare, flexibility permits an organization to absorb hits without impairing its ability to function, ensures smooth cooperation between all the different elements and, most importantly, flexibility is necessary defeat to an active, reactive opponent, thinking opponent, whether in offensive or defensive operations.¹⁰⁰ Critical to the element of flexibility in a rapidly moving, fluid battle or campaign is the sixth vital element of maneuver warfare, decentralized command.

Decentralized Command

Even with the most technologically advanced communication system, it is likely that the information needed to monitor the situation may well be so great as to cause information overload thereby impeding rapid decision making and movement; paralysis by analysis. The only way to solve this dilemma is to rely on a distribution of responsibility among the various echelons of command. "In maneuver warfare, units and commanders who merely follow orders—let alone wait for them—are useless."¹⁰¹ Therefore, if subordinate commanders, and troops are to use the initiative required for the

conduct of maneuver warfare, they must understand the army's objectives at least two levels above their own. They must understand the purpose of their operation as it fits into the plans of higher headquarters. The German concept of Auftrgtaktik or directive control is key to the decentralization necessary for successive Boyd Cycles in maneuver warfare.

The idea is that in order to exploit opportunities and the initiative of subordinates, the commander should confine his operations order to explaining the mission and his intent regarding the enemy. Including only such details as are absolutely necessary to coordinate the actions of his subordinates, he should allow his subordinates the freedom to figure out how to accomplish the task...¹⁰²

Similarly, mission type orders are inherent in current U.S. Army doctrine. Fm 100-5 states that mission orders specify what subordinate commands are to do without prescribing how they must do it.¹⁰³

Means of Defeat: The Theory of Dislocation

Maneuver warfare seeks to defeat the enemy by attacking of threatening his center of gravity, the critical vulnerability, instead of his source of strength through the use of dislocation. Webster's Dictionary defines dislocation as "to put out of place: as...to put (a body part) out of order by displacing a bone from its normal connections...to cause confusion in: cause to deviate from a normal or predicted course, situation or relationship...."¹⁰⁴ The analogy of a displaced bone is useful to dislocation theory as it applies to maneuver warfare. If an athlete suffers a dislocated shoulder, it is obvious that he can no longer perform his primary role, in a physical sense, the injury makes the athlete useless to his team. Therefore, the athlete becomes irrelevant to the outcome of

the game. Additionally, if dislocation causes confusion from one's "normal course, situation or relationship," to replace the injured athlete in the lineup can cause confusion on the team because the coach is forced to deviate from the game plan based on a change in the athlete's relationship to the team.¹⁰⁵

For the purpose of maneuver warfare, dislocation is defined as rendering the enemy strength irrelevant by removing him from the decisive point, or – preferably – by removing the decisive point from him.¹⁰⁶

Dislocation is an active measure, which attempts to set aside enemy strengths in order to allow us to apply our strengths against the enemy's critical vulnerabilities. It does not seek destruction of enemy strengths as the primary means of defeat, but seeks to dislocate those strengths as the first critical step in defeat, then destroy them (if necessary) with an asymmetrical fight.¹⁰⁷

There are at least four types of dislocation: positional, functional temporal, and moral. Although each of these may differ in how they render an enemy strength irrelevant, they are all based on a decisive fight against a disadvantaged enemy.

Positional Dislocation

Positional dislocation renders an enemy strength irrelevant by causing it to be in the wrong place, oriented in the wrong direction, or in the wrong formation to achieve its purpose. We positionally dislocate an enemy strength by removing that strength from the decisive point or by removing the decisive point from that strength.¹⁰⁸

The historical appeal of envelopment as a form of maneuver is that it moves the decisive point from in front of the enemy position, where his attention is fixed, we then attack his flank, where he is vulnerable. Similarly, the turning movement positionally dislocates the strength of the defense by causing the enemy to leave a prepared defense

and attack in a direction in which they were not prepared.¹⁰⁹ This is reminiscent of the German ideal of Kesselschlacht.

Functional Dislocation

Functional dislocation seeks to render enemy strengths irrelevant by making them temporarily dysfunctional through the disruption of key functions at the critical time.¹¹⁰

As previously discussed, the combined arms approach to battle seeks to achieve functional dislocation by presenting an enemy strength with more problems than it can react to at once, thereby placing the enemy on “the horns of a dilemma.”

Temporal Dislocation

Temporal dislocation renders the enemy strengths irrelevant by making enemy actions, decisions, and dispositions untimely. Temporal dislocation focuses on fighting the enemy when he is unready.¹¹¹ Dislocating the enemy with respect to time is a consequence of surprise; a vital element of maneuver warfare. Edward Luttwak describes the effects of surprise as follows:

Surprise can now be recognized for what it is: not merely one factor of advantage in warfare among others, *but rather the suspension, if only brief, if only partial, of the entire predicament of strategy*, even as the struggle continues. Without a reacting enemy, or rather according to the extent and degree that surprise is achieved, the conduct of war becomes mere administration [*Italics in original*].¹¹²

Robert Leonhard argues that the underlying precept to temporal dislocation is that “all military organizations are perpetually unready for combat.”¹¹³ Because military units perform a variety of activities other than fighting (i.e. training, movement, resupply, planning, etc.), this perpetual unpreparedness is therefore, a natural condition of the

military in war and peace. That the very requirement to establish security exists and is a priority in military operations is recognition that military units are in a perpetual state of unreadiness.¹¹⁴

Temporal dislocation renders an enemy strength irrelevant by fighting it when it is unready—in its normal state.

Moral Dislocation

Moral Dislocation aims at manipulating an enemy strength irrelevant by defeating the minds and spirits of its soldiers, especially its leaders and causing them to lose their will to fight.¹¹⁵ Morale dislocation derives from the combined effects of the other forms of dislocation. Napoleon said, “In war the moral element is to all others as three is to one.”¹¹⁶ “While war may be politics by other means, combat is not an extension of policy. Combat is a contest of arms and will between tired and terrified men.”¹¹⁷ These quotes observe one simple fact—an enemy unit may be strong in many respects, but if its soldiers are unwilling to fight, its leaders incapable of or unable to make decisions, those strengths are irrelevant.

If the effects of maneuver warfare can lead to moral dislocation; that is, if both the leader and his soldiers believe the situation is hopeless and lose their will to fight. The friendly commander has achieved a decision over an otherwise strong enemy unit.

Implications for the Future

It can be argued that most if not all of the above described maneuver warfare concepts are not only possible today, but described in current joint and service doctrine. While this may be true, evidence suggests that the U.S. Army does not necessarily feel

obligated to follow its written doctrine.¹¹⁸ In fact, Martin van Creveld contends that regardless of their current doctrine, the American military tends to find maneuver warfare counterintuitive.¹¹⁹ He contends that the U.S. armed forces have had the tradition (and luxury) of fighting from a position of overwhelming strength. Therefore:

For them, war has often been a question of maximizing the blows they could deliver on the basis of available resources, then exchanging blow for blow until the weaker side—almost always the enemy—was attrited to the point of being no longer combat capable.¹²⁰

This argument is congruent with those of Edward Luttwak who contends that “nations that see themselves as materially strong or merely rich in resources... will generally feel free to pursue an attritional approach.”¹²¹ Conversely, “those who view themselves... as materially weak, will ... instead adjust their priorities to the vulnerabilities they see in others.”¹²² An Asymmetric advantage.

The U.S. Military no longer has the luxury of “maximizing the blows they could deliver on the basis of available resources.” The road to the future is partially paved—we will be a smaller, technology advanced, power projection force, that will have to rely on maneuver warfare; especially the various forms of dislocation, to impose our will on the enemy through asymmetric means. Emerging doctrine such as *Joint Vision 2010* and *The Concept for Future Joint Operations* is based on maneuver warfare theory. However, there must be additional training to ensure a future military leaders are capable of conceptualizing how to achieve decisive results from the *defeat* an opponent vice the material *destruction* inherent in attrition based warfare.

V. The Future: Joint Vision 2010

"Full Spectrum Dominance will be the key characteristic we seek for our Armed Forces in the 21st century."

Joint Vision 2010

Joint Vision 2010 is the Chairman's "operationally based template for the evolution of the Armed Forces for a challenging and uncertain future."¹²³ *Joint Vision 2010* builds upon information age advances in intelligence and command and control to transform the traditional functions of maneuver, strike, protection, and logistics into four new operational concepts: dominant maneuver, precision engagement, full dimension protection, and focused logistics.¹²⁴

Dominant Maneuver

Joint Vision 2010 defines dominant maneuver as "the multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, land, sea, and space forces to accomplish the assigned operational tasks."¹²⁵ Dominant maneuver evolved from and is related to the traditional maneuver of the past. At an elementary level, maneuver is the movement of a force to gain positional advantage over an opponent. If the purpose of maneuver is to gain leverage against an opponent; to pit strength against an opponent's weakness, then *Joint Vision 2010* envisions the evolution from maneuver to dominant maneuver through the union of maneuver warfare theory with emerging technology. Dominant maneuver seeks to capitalize on the strengths of information technology using highly trained and mobile forces to dislocate an opponent and force him to react under unfavorable circumstances. Nearly seventy years ago, General Guderian was faced with a similar situation. His

vision combined infiltration tactics and tank employment theory with technology to develop the concept behind Blitzkrieg.

Through the combination of the previously discussed vital elements of maneuver warfare theory (tempo, Schwerpunkt, surprise, combined arms, flexibility, and decentralized command) with emergent information age technology, dominant maneuver will provide the U.S. military a significant advantage over its future potential opponents. Dominant maneuver forces may be able to apply leverage asymmetrically, so that strength is used against enemy weaknesses. With an edge in mobility and information capabilities, dominant maneuver forces will be able to control the tempo of operations, and dislocate an enemy through a combination of surprise and speed. By rapidly putting an American presence on the ground, a crisis ranging from natural disaster to conflict may be defused before it occurs. Through the flexibility offered by information age technology, the increased potential exists to psychologically defeat an opponent without the excessive and costly methods of attrition warfare.¹²⁶

Although defeating an enemy will remain the primary mission of dominant maneuver, many situations will not be suitable for the employment of firepower. These forces will have to be able to perform many other functions. These can range from support operations such as humanitarian assistance to stability operations like peace keeping... “it was [dominant maneuver] forces on the ground... that successfully secured U.S. interests [in Bosnia and Haiti].”¹²⁷

Precision Engagement

Joint Vision 2010 defines precision engagement as “a system of systems that

enables our forces to locate the objective or target, provide responsive command and control, generate the desired effect, assess our level of success, and retain the flexibility to re-engage with precision when required.”¹²⁸ Precision engagement evolved from strike operations and thus corresponds to firepower. Since firepower is simply the amount of fire (such as bullets, artillery, or bombs) that can be delivered on the enemy, precision engagement is therefore, highly efficient technologically enhanced fires intended to defeat or destroy a target without wasting effort or munitions. Emerging Information technologies applied to current targeting processes will allow American forces to decide which enemy capabilities are most significant, detect these capabilities, precisely attack them, and then assess the results. Precision engagement thus offers the prospect of U.S. forces efficiently inflicting high rates of attrition on an opponent and, “precision engagement hones the usually blunt instrument of military power, providing the ability to deliver precision effects to meet political objectives.”¹²⁹

Through standoff delivery capabilities and stealth technology, precision engagement can reduce friendly exposure to enemy fires since fewer aircraft sorties and artillery engagements will be necessary as a result of precision engagement efficiencies.¹³⁰

Vulnerabilities

Despite its many advantages, dominant maneuver employed exclusive of precision engagement is vulnerable. Even with enhanced capabilities, maneuver forces in the future may not always be able to dislocate and opponent. This could result from a variety of situations; perhaps no exposed enemy flanks are available, or an enemy is

sophisticated enough to counter U.S. advantages in information technology. If so, then enemy strengths must be attacked by superior firepower.¹³¹

Likewise, precision engagement has exploitable vulnerabilities. The targeting process can be interrupted at several points by a tough enemy seeking to protect his own forces. One means to thwart precision fires is through concealment and deception; this counters the military's abilities to choose the best targets, find them and assess previous strikes. Actions could be taken to blind intelligence or command and control assets. For example, enemy hackers could attack computer systems, or electromagnetic pulse weapons might disrupt electronic systems, yet avoid casualties that would justify nuclear retaliation. A sophisticated enemy could use false indicators to portray an incorrect picture and deceive our sensors, or use anti-satellite weapons to wreak havoc on the systems necessary for precision engagement. Sabotage, electronic jamming and ground counter-reconnaissance are traditional means of blinding the opponent. An opponent could use camouflage and electronic, communications, and operations security to escape detection, or simply blend into the background of noncombatants. This would present particular problems in urban environments, or in stability and support operations. Information technology will not provide immunity to various ruses and tricks that a clever enemy could devise.¹³²

Another means to thwart precision fires is through exposure limitation to counter our ability to strike. An enemy can limit his exposure by locating in population centers, across international borders in safe countries, or in other areas off limits to American strikes. An enemy could asymmetrically attack our limited number of expensive weapons delivery platforms; the loss of even a few of these platforms can have an impact.

Finally, an enemy can limit the effects of precision fires by hardening key targets and facilities. Strong permanent fortifications, such as deep concrete bunkers, can be virtually immune to destruction unless nuclear weapons are employed.¹³³

Finally, even in an outright conflict with suitable targets, precision engagement will probably not cause sufficient attrition quickly enough to be adequate by itself. In the past, determined antagonists have sustained severe punishment without collapsing.¹³⁴

Contested Territory

As defense planners tailor the defense budget to meet modernization needs: it appears from the ongoing debates in various defense publications, that service views of future doctrine begin to diverge, specifically in the realm of dominant maneuver. The Army envisions dominant maneuver ensuring the ability to prevail in any conflict, and the Air Force is building the ability to control battlespace with precision engagement through air, space, and information.¹³⁵ This is the “yin and yang” of defense strategy:

[This] dichotomy... can be read more crudely as a struggle between land and air power as the decisive centerpiece of the joint force.... It is not Service pride, but styles of warfare that are in contention.... To the Army, the “significance of land power as a force of decision will continue to rise” in future contingencies. Precision engagement sets the conditions for and “vastly enhances” dominant maneuver. From the air component side, precision engagement may also produce decisive operations... In the 21st century, the air component will be able to “find, fix or track and target anything that moves on the surface of the earth.”¹³⁶

What these distinct visions lay out is a question of whether future U.S. military power will center on land power, or rely on air power. The answer is both.

Strategic Balance

Despite the strengths of precision engagement and dominant maneuver, the vulnerabilities of each make their use in isolation impractical. Carrying either precision attrition or maneuver warfare to an extreme creates the fallacy of bloodless conflict.

The ultimate in precision engagement is such a precise application of firepower from a safe standoff that friendly losses are zero, collateral damage is naught, and even most enemy troops are spared while their equipment is destroyed. Unfortunately, without an idiotically obliging enemy, this scenario is a fantasy. The ultimate in dominant maneuver is putting the opponent in such an untenable position and so unhinging them psychologically that they are defeated without a shot being fired... While it is certainly desirable and may be possible to win in this way, depending on it to win is foolish. Nearly all past operations have used a mix of attrition and maneuver to achieve success.¹³⁷

Future operations will take place on a continuum between the extremes of ultimate precision engagement and ultimate dominant maneuver.

Balance provides choices. When this balance has been lacking in the past, NCA has been forced into a strategic box—and the nation has paid a high toll in treasure and blood to get out.¹³⁸

Balancing dominant maneuver and precision engagement mitigates the risk to the other's vulnerabilities. Maneuver forces can provide additional eyes to find an opponent and degrade his ability to hide. Dispersing to limit exposure to precision fires can make the enemy vulnerable to piecemeal destruction by maneuver forces. Enemy attempts to limit damage by fortifying often results in an immobility that maneuver forces can exploit. Precision engagement can open an opportunity for dominant maneuver where none exists. In such cases, firepower sets the conditions for success that maneuver can exploit.

VI. Conclusion

"Fire without movement is indecisive. Exposed movement without fire is disastrous. There must be effective fire combined with skillful movement."

Infantry in Battle, 1939

Techniques to optimize technology on the battlefield are not new. History has shown that previous endeavors to use emerging technology to dominate the battlefields with firepower have ultimately failed. As our military leadership strives to choose which concepts for future warfare will be developed into doctrine, they cannot afford to ignore the lessons of the past.¹³⁹

Although firepower came to dominate the western front in the early years of WWI, overwhelming firepower alone could not bring victory on the battlefield.

Tacticians in that war attempted to focus artillery at the point of penetration and merely use ground forces to exploit the effects of this firepower. Enemy forces ultimately countered this tactic by adopting new maneuver techniques, not by responding with greater firepower. The defender merely arrayed forces in depth or used reserves to rapidly reinforce the point of penetration to deny the attempted exploitation. Ultimately, it was the inability to effectively maneuver in conjunction with this overwhelming firepower that caused the stalemate in the fields of France.¹⁴⁰

The return to a balanced employment of firepower and maneuver eventually broke that stalemate and brought victory to the western allies.

Information age technology has again generated a close look at concepts that would optimize emerging capabilities on the future battlefield. "Proponents of a renewed ascendancy of fires sound hauntingly similar to previous advocates of earlier firepower based doctrine."¹⁴¹ Previous conflicts illustrate that over-reliance on one aspect of combat power failed to bring victory.

Dominant maneuver forces can defeat an enemy in war, preempt emerging problems through peacetime engagement, or deliver humanitarian relief. The most difficult and dangerous operations are those with an active, thinking opponent. Maneuver can dislocate opponent by disrupting his command and control, shattering his units' cohesion, and by breaking him psychologically. Most combat operations will require the employment of dominant maneuver and precision engagement in unison to defeat the enemy. Dominant maneuver or precision engagement can each achieve decisive results, but the use of one concept exclusive of the other creates risk and can leave our forces vulnerable to an asymmetrical threat.¹⁴²

The right mix will support operations throughout the spectrum of conflict, from disaster relief to war. Both types of forces must be big and powerful enough to mitigate the risk posed by the other's inherent vulnerabilities. Since the proportion of precision engagement and dominant maneuver forces in any given situation will vary, proper balance of forces is achieved if they complement each other while mitigating risk.¹⁴³

This monograph concludes that dominant maneuver and precision engagement are not separate concepts, but mutually supporting elements of the same operational concept. It is the author's opinion that dominant maneuver is the overarching operational concept and precision engagement provides the "technical" means to enable the desired end-state. What matters is not the means used to defeat enemy, but the desired effects. Both can use movement and fires, EW, PSYOP, Info Ops, etc. to attack an enemy's strengths as well as his critical vulnerabilities to ultimately cause his defeat.

While the U.S. military should certainly continue to leverage all technology that contributes to decisive victory, the strength of a military's combat power lies in a balance

of capabilities, not a preponderance of one. As Clausewitz noted, “an army composed simply of artillery... would be absurd in war.”¹⁴⁴ Dominant maneuver and precision engagement must continue to complement one another for the U.S. armed forces to win on the future battlefield.

Finally, the U.S. military must be careful in referring to dominant maneuver and precision engagement in terms of service unique capabilities. Doing so opens unnecessary doors to inter-service rivalry and budgetary debate, which overshadows the real issues: What effects does the Joint Force Commander require against the enemy’s critical vulnerability? How is a campaign developed to achieve those effects? And, what capabilities are available and required? If the Joint Force Commander looks at his components not as separate services, but in terms of available capabilities required to dislocate the enemy by attacking a critical vulnerability in time, space, purpose and effects, we will be successful in “compelling the enemy to do our will.”

Endnotes

¹ LTC Robert Leonhard, in a discussion with the author at the School of Advanced Military Studies, Fort Leavenworth, Kansas, 22 January 1998.

² Field Manual 100-5, Operations, HQ, Department of the Army, Washington DC, June 1993, p. 2-10.

³ LTC Chris Baggott, in a discussion with the author at the School of Advanced Military Studies, Fort Leavenworth, Kansas, 4 March 1998.

⁴ H.T. Hayden, Warfighting: Maneuver Warfare in the U.S. Marine Corps, (London: Greenhill Books, 1995), p. 37.

⁵ Carl von Clausewitz, On War, trans. and ed. M. Howard and P. Paret, (Princeton, NJ: Princeton University Press, 1984), p. 119.

⁶ Gary E. Phillips, "Some Thoughts on the Nature of Dominant Maneuver and Precision Engagement," Draft Paper, School of Advanced Military Studies, (Fort Leavenworth, Kansas), 1997.

⁷ Gordon A Craig, "Delbruck: The Military Historian," Makers of Modern Strategy, ed. Edward Mead Earle, (Princeton: Princeton University Press, 1943), pp. 272-273.

⁸ Craig, "Delbruck: The Military Historian," Makers of Modern Strategy, pp. 272-273.

⁹ Edward N. Luttwak, Strategy: The Logic of War and Peace, (Cambridge: The Belknap Press, 1987) p. 92-93.

¹⁰ Kevin S. Woods, "The Changing Application of Maneuver," Command and General Staff College, (Fort Leavenworth Kansas), p. 2.

¹¹ Luttwak, Strategy: The Logic of War and Peace, p. 92.

¹² Ibid.

¹³ Ibid.

¹⁴ Luttwak, Strategy: The Logic of War and Peace, p. 93.

¹⁵ Giulio Douhet, The Command of the Air, Coward-McCann, Inc., 1942, reprinted by USAF Warrior Studies, Center for Air Force History, 1983, p. 28.

¹⁶ Ibid.

¹⁷ General Faugeron, "The Effects of Artillery Fire," The Field Artillery Journal, Vol. XXII, Jan/Feb. 1932, p. 59.

¹⁸ Woods, "The Changing Application of Maneuver," Command and General Staff College, pp. 12-13.

¹⁹ Luttwak, Strategy: The Logic of War and Peace, p. 93.

²⁰ Ibid.

²¹ Field Manual 100-5, Operations, p. 2-10.

²² Luttwak, Strategy: The Logic of War and Peace, p. 93.

²³ Ibid.

²⁴ Craig, "Delbruck: The Military Historian," Makers of Modern Strategy, p. 274.

²⁵ The Austro-Prussian War or Seven Weeks War was fought June 15 – August 23 1866 between Austria and Prussia. Bismark provoked the war as a way of expelling Austria from the German Confederation, thereby assuring German Hegemony. The pretext was a dispute between Prussia and Austria over the administration of the Schleswig-Holstien. Prussia quickly overran Holstein and the German State allied with Austria, and was victorious in Bohemia and Italy. The treaty of Prague ended the war and Austria was excluded from German affairs and forced to cede Venetia to Italy. Prussia demanded no territory from Austria but annexed Hanover, Hesse, Nassau, and Frankfurt, laying the groundwork for the establishment of the German Empire in 1871.

²⁶ Russell Hall, "Defining Joint Vision 2010's Dominant Maneuver," Command and General Staff College, (Fort Leavenworth Kansas), p. 19.

²⁷ Larry H. Addington, The Blitzkrieg Era and the German General Staff, 1865-1941, (New Brunswick, NJ: Rutgers University Press) p. 53.

²⁸ Gunther E. Rothenberg, "Moltke, Schlieffen, and the Doctrine of Strategic Envelopment," in Makers of Modern Strategy from Machiavelli to the Nuclear Age, ed. Peter Paret, (Princeton University Press, 1986), p.229.

²⁹ Hall, "Defining Joint Vision 2010's Dominant Maneuver," p. 21.

³⁰ Rothenberg, "Moltke, Schlieffen, and the Doctrine of Strategic Envelopment," p. 296.

³¹ Michael E. Howard, War in European History, (Oxford: Oxford University Press, 1976) p. 100

³² Ibid.

³³ William Carr, The Origins of the War of German Unification, (New York: Longman, 1991), p.17.

³⁴ Larry H. Addington, The Patterns of War Since the Eighteenth Century, (Bloomington, IN: Indiana University Press, 1977), p. 53.

³⁵ Carr, The Origins of the War of German Unification, p.137.

³⁶ Addington, The Patterns of War Since the Eighteenth Century, p. 53.

³⁷ William McElwee, The Art of Warfare: Waterloo to Mons, (Bloomington: Indiana University Press, 1974, p. 56.

³⁸ Howard, War in European History, pp. 97-98.

³⁹ Rothenberg, "Moltke, Schlieffen, and the Doctrine of Strategic Envelopment," p. 296.

⁴⁰ Hajo Holborn, "The Prusso-German School: Moltke and the Rise of the German General Staff" in Makers of Modern Strategy from Machiavelli to the Nuclear Age, ed. Peter Paret, (Princeton University Press, 1986), p.281.

⁴¹ J.F.C. Fuller, The Conduct of War: 1789-1961, (New York: DaCapo Press, 1992) p. 114.

⁴² Hall, "Defining Joint Vision 2010's Dominant Maneuver," p. 24.

⁴³ Addington, The Blitzkrieg Era and the German General Staff, 1865-1941, p. 9.

⁴⁴ Hall, "Defining Joint Vision 2010's Dominant Maneuver," p. 25.

⁴⁵ McElwee, The Art of Warfare: Waterloo to Mons, p. 129.

⁴⁶ Hall, "Defining Joint Vision 2010's Dominant Maneuver," pp. 28-29.

⁴⁷ Addington, The Blitzkrieg Era and the German General Staff, 1865-1941, p. 4.

⁴⁸ Addington, The Blitzkrieg Era and the German General Staff, 1865-1941, p. 19.

-
- ⁴⁹ Addington, The Blitzkrieg Era and the German General Staff, 1865-1941, p. 15.
- ⁵⁰ J.F.C. Fuller, A Military History of the Western World, vol. III, (New York: Funk and Wagnalls Company, Inc., 1956), p. 229.
- ⁵¹ J.F.C. Fuller, The Conduct of War: 1789-1961. (New York: DaCapo Press, 1992), p. 160.
- ⁵² William Robertson, Soldiers and Statesmen: 1914-1918, vol. I, (New York: Charles Scribner's Sons, 1926), p. 244.
- ⁵³ Paddy Griffith, Battle Tactics of the Western Front, (New Haven: Yale University Press, 1994), p. 143.
- ⁵⁴ U.S. Army War College, Artillery in Offensive Operations, (Washington, DC: U.S. Government Printing Office, July 1917), p. 33.
- ⁵⁵ David T. Zabecki, Steel Wind: Colonel George Bruchmueller and the Birth of Modern Artillery, (Westport, CT.: Praeger Publishers, 1994), p. 14.
- ⁵⁶ U.S. War Department, General Notes on the Use of Artillery, (Washington, DC: U.S. Government Printing Office, 1917), p. 14.
- ⁵⁷ Shelford Bidwell and Dominick Graham, Fire-Power: British Army Weapons and Theories of War 1904-195, (London: George Allen & Unwin, 1982), p. 101.
- ⁵⁸ John Terraine, White Heat: The New Warfare 1914-1918, (London: Sidgwick & Jackson, 1982), p. 215.
- ⁵⁹ Bidwell and Graham, Fire-Power: British Army Weapons and Theories of War 1904-195, p. 68.
- ⁶⁰ Terraine, White Heat: The New Warfare 1914-1918, p. 194.
- ⁶¹ Bidwell and Graham, Fire-Power: British Army Weapons and Theories of War 1904-195, p. 105.
- ⁶² Zabecki, Steel Wind: Colonel George Bruchmueller and the Birth of Modern Artillery, p. 107.
- ⁶³ William H. Hallahan, Misfire: The History of How America's Small Arms have Failed our Militray, (New York: Charles Scribner's Sons, 1994), p. 311.
- ⁶⁴ Drew Middleton, Crossroads of Modern Warfare, (New York: Doubleday & Company, Inc. 1983), p. 51.
- ⁶⁵ Timothy Lupfer, "The Dynamics of Doctrine: The Changes in German Tactical Doctrine During the First World War," (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1981) pp. 41-54.
- ⁶⁶ Addington, The Blitzkrieg Era and the German General Staff, 1865-1941, p. 23.
- ⁶⁷ Martin van Creveld, Air Power and Maneuver Warfare, (Maxwell Airforce Base: Air University Press, 1994), p. 26.
- ⁶⁸ The Concept of Blitzkrieg:
- As the Airforce attacks along the enemy front-line, rear positions, main roads, airfields and communication centers, as the infantry places smoke curtains on the entire frontline (at least at several places) and engages in small numbers, to deceive the enemy from knowing where the main force will attack.
 - Concentrated mechanized forces breakthrough main lines of defense pursuing and engaging defenders. Infantry continues to place the smoke curtains and engages in small numbers to deceive the enemy.

-Infantry and other support units attack enemy flanks in order to link up with other groups.

-Mechanized groups spearhead deeper into the enemy territory outflanking the enemy positions and paralyzing the rear.

-Main force links up with other units encircling and cutting off the enemy.

⁶⁹ Matthew Cooper, The German Army 1933-1945, (Scarborough House, 1978), p. 130.

⁷⁰ Cooper, The German Army 1933-1945, p. 122

⁷¹ Robert Doughty, The Seeds of Disaster: The Development of French Army Doctrine 1919-1939, (Hamden, CT: Archon Books, 1985), p.17.

⁷² Doughty, The Seeds of Disaster: The Development of French Army Doctrine 1919-1939, pp.22-23.

⁷³ Cooper, The German Army 1933-1945, p. 130.

⁷⁴ Ken Diegthon, Blitzkrieg, (New York: Ballantine Books, 1980), pp. 102-103.

⁷⁵ During 1920s, British military philosophers Captain Sir Basil Liddell Hart, General J.F.C. Fuller and General Martell further developed tactics of mobile warfare. All of them found tank to be an ultimate weapon able to penetrate deep into enemy territory while followed by infantry. In late 1920s and early 1930s, Charles De Gaulle, Hans von Seeckt, Heinz Guderian and many others became interested in the concept of mobile warfare and tried to implement it in an organizational structure of their armies. Heinz Guderian organized Panzers into self-contained Panzer Divisions working with the close support of motorized infantry

⁷⁶ Cooper, The German Army 1933-1945, p. 142.

⁷⁷ Cooper, The German Army 1933-1945, p. 148.

⁷⁸ Addington, The Blitzkrieg Era and the German General Staff, 1865-1941, p. 19.

⁷⁹ Martin van Creveld, Supplying War: Logistics from Wallenstein to Patton, (Cambridge: Cambridge University Press, 1977), p. 74.

⁸⁰ Cooper, The German Army 1933-1945, pp. 195-196.

⁸¹ Cooper, The German Army 1933-1945, p. 199.

⁸² Cooper, The German Army 1933-1945, p. 202.

⁸³ Cooper, The German Army 1933-1945, pp. 208-209.

⁸⁴ Cooper, The German Army 1933-1945, p. 229.

⁸⁵ Richard E Simpkin, Race to the Swift, (London: Brassey's, 1985), pp. 36-53.

⁸⁶ FMFM 1, Warfighting, (Washington, DC: Headquarters, U.S. Marine Corps), p. 59.

⁸⁷ FMFM 1, Warfighting, p. 59.

⁸⁸ FMFM 1, Warfighting, p. 59.

⁸⁹ FMFM 1, Warfighting, pp. 59-60.

⁹⁰ van Creveld, Air Power and Maneuver Warfare, pp. 2-8.

⁹¹ William S. Lind, The Theory and Practice of Maneuver Warfare, (Boulder, CO: Westview Press Inc., 1985), p. 5. See also Martin van Creveld, Air Power and Maneuver Warfare, p. 3.

⁹² Lind, The Theory and Practice of Maneuver Warfare, p. 17.

-
- ⁹³ van Creveld, Air Power and Maneuver Warfare, p. 3.
- ⁹⁴ The 1940 German invasion of France is an excellent example of placing Schwerpunkt against a weakness to achieve operational success. The French and British expected the invasion route to be through Belgium, so they massed their strength there along the Maginot Line. The Germans designated General Rundstedt's Army Group A the Schwerpunkt at Ardennes; lightly guarded and considered impenetrable by the allies. General von Bock's Army Group B along the Belgian Border and General von Leeb's Army Group C along the Maginot supported with fixing attacks. Spearheaded by panzer forces, Rundstedt's forty-five divisions quickly poured through the "gap" at Ardennes.
- ⁹⁵ van Creveld, Air Power and Maneuver Warfare, p. 4.
- ⁹⁶ Ibid.
- ⁹⁷ U.S. Army FM 100-5, Operations, p. 2-3.
- ⁹⁸ van Creveld, Air Power and Maneuver Warfare, p. 5.
- ⁹⁹ U.S. Army FM 100-5, Operations, p. 9-2.
- ¹⁰⁰ van Creveld, Air Power and Maneuver Warfare, pp. 6-7.
- ¹⁰¹ van Creveld, Air Power and Maneuver Warfare, p. 7.
- ¹⁰² Robert Leonhard, The Art of Maneuver Warfare, (Novato, CA: Presidio Press, 1991), p. 50.
- ¹⁰³ U.S. Army FM 100-5, Operations, p. 6-5 – 6-6.
- ¹⁰⁴ Webster's Third International Dictionary, p. 651.
- ¹⁰⁵ David E Funk, "Tactical Dislocation: Force XXI Doctrine or Just Another Pretty Theory?" (Fort Leavenworth, Kansas: School of Advanced Military Studies Monograph, 1997), p. 23.
- ¹⁰⁶ Leonhard, The Art of Maneuver Warfare, pp. 66-67.
- ¹⁰⁷ Funk, "Tactical Dislocation: Force XXI Doctrine or Just Another Pretty Theory?" p. 24.
- ¹⁰⁸ Leonhard, "Dislocation and FORCE XXI: A New Perspective on Commander's Intent." p. 4.
- ¹⁰⁹ Funk, "Tactical Dislocation: Force XXI Doctrine or Just Another Pretty Theory?" p. 27.
- ¹¹⁰ Leonhard, "Dislocation and FORCE XXI: A New Perspective on Commander's Intent." p. 5.
- ¹¹¹ Leonhard, "Dislocation and FORCE XXI: A New Perspective on Commander's Intent." p. 6.
- ¹¹² Luttwak, Strategy: The Logic of War and Peace, p. 8.
- ¹¹³ Leonhard, "Dislocation and FORCE XXI: A New Perspective on Commander's Intent." p. 6.
- ¹¹⁴ Leonhard, The Art of Maneuver Warfare, pp. 104-106.
- ¹¹⁵ Leonhard, "Dislocation and FORCE XXI: A New Perspective on Commander's Intent." pp. 7-9.
- ¹¹⁶ Frank H. Simonds in "Ardant du Picq," Preface to Battle Studies, in Roots of Strategy, Book 2, Colonel John N. Greely and Major Robert C. Cotton trans. (Harrisburg, Pennsylvania: Stackpole Books, 1987), vii.
- ¹¹⁷ Mitchell M. Zais, "Ardant du Picq: Unsung Giant of Military Theory," Army, April 1985, p. 58.
- ¹¹⁸ See David E Funk's monograph, "Tactical Dislocation: Force XXI Doctrine or Just Another Pretty Theory?" In this monograph, the author reviews several arguments on the discrepancies between current doctrinal concepts and actual practice.

-
- ¹¹⁹ van Creveld, Air Power and Maneuver Warfare, p. 8.
- ¹²⁰ Ibid.
- ¹²¹ Edward N. Luttwak, Strategy: The Logic of War and Peace, (Cambridge: The Belknap Press, 1987) p.97
- ¹²² Luttwak, Strategy: The Logic of War and Peace, pp. 97-98.
- ¹²³ Joint Chiefs of Staff, Joint Vision 2010, (Washington, DC: Government Printing Office, 1996), p. i.
- ¹²⁴ Ibid.
- ¹²⁵ Joint Chiefs of Staff, Joint Vision 2010, p. 20.
- ¹²⁶ Grant Steffan, "Dominant Maneuver and Precision Engagement," Unpublished Paper, (FORSCOM J5, Fort McPherson, Georgia, 1997), p. 4.
- ¹²⁷ Dennis J. Reimer, "Dominant Maneuver and Precision Engagement," Joint Forces Quarterly, Winter 96/97. p. 14.
- ¹²⁸ Joint Chiefs of Staff, Joint Vision 2010, p. 21.
- ¹²⁹ Ronald R. Fogleman, "The Air Force and Joint Vision 2010," Joint Forces Quarterly, Winter 96/97. p. 27.
- ¹³⁰ Steffan, "Dominant Maneuver and Precision Engagement," p. 2.
- ¹³¹ Steffan, "Dominant Maneuver and Precision Engagement," p. 4.
- ¹³² Ibid.
- ¹³³ Steffan, "Dominant Maneuver and Precision Engagement," p. 3.
- ¹³⁴ Steffan, "Dominant Maneuver and Precision Engagement," pp. 3-4.
- ¹³⁵ Scott Bowden, "Rethinking Defense," (Independent Research and Information Services, Corp. 1997), p. 4.
- ¹³⁶ Bowden, "Rethinking Defense," p. 5.
- ¹³⁷ Steffan, "Dominant Maneuver and Precision Engagement," p. 5.
- ¹³⁸ Reimer, "Dominant Maneuver and Precision Engagement," p. 14.
- ¹³⁹ Mark G Carey, "Forging Apollo's Golden Bow: Long Range Precision Fires in Future High Intensity Combat," (Fort Leavenworth, Kansas: School of Advanced Military Studies Monograph, 1996), p. 40.
- ¹⁴⁰ Carey, "Forging Apollo's Golden Bow: Long Range Precision Fires in Future High Intensity Combat," pp. 40-41.
- ¹⁴¹ Carey, "Forging Apollo's Golden Bow: Long Range Precision Fires in Future High Intensity Combat," p. 42.
- ¹⁴² Steffan, "Dominant Maneuver and Precision Engagement," p. 5.
- ¹⁴³ Steffan, "Dominant Maneuver and Precision Engagement," Unpublished Paper, (FORSCOM J5, Fort McPherson, Georgia, 1997), p. 6.
- ¹⁴⁴ Carl von Clausewitz, On War. p. 285.

Bibliography

Books

- Addington, Larry H. The Patterns of War Since the Eighteenth Century. Bloomington, Indiana University Press, 1977.
- _____. The Blitzkrieg Era and the German General Staff, 1865-1941. New Brunswick, NJ: Rutgers University Press, 1971.
- Bellamy, Chris. The Future of Land Warfare. New York, NY St. Martins Press, 1987.
- _____. The Evolution of Modern Land Warfare. New York: Routledge, 1990.
- Bidwell, Shelford and Dominick Graham. Fire-Power: British Army Weapons and Theories of War 1904-195. London: George Allen & Unwin, 1982.
- Carr, William. The Origins of the War of German Unification, New York: Longman, 1991.
- Cooper, Matthew. The German Army 1933-1945. Chelsa, MI: Scarborough House, 1978.
- _____. Supplying War: Logistics from Wallenstein to Patton. Cambridge: Cambridge University Press, 1977.
- Dieghton, Ken. Blitzkrieg. New York: Ballantine Books, 1980.
- Delbruck, Hans. History of the Art of War: The Modern Era, Vol. IV, Trans. Walter J. Renfroe, Jr, Westport: Greenwood Press, 1985.
- Doughty, Robert. The Seeds of Disaster: The Development of French Army Doctrine 1919-1939. Hamdem, CT: Archon Books, 1985.
- Fuller, J.F.C. A Military History of the Western World. Vol. III. New York: Funk and Wagnalls Company, Inc., 1956.
- _____. The Conduct of War: 1789-1961. New York: DaCapo Press, 1992.
- Griffith, Paddy. Battle Tactics of the Western Front. New Haven: Yale University Press, 1994.
- Hallahan, William H. Misfire: The History of How America's Small Arms have Failed our Military. New York: Charles Scribner's Sons, 1994.

- Hayden, H. T. Warfighting: Maneuver Warfare in the U.S. Marine Corps. Mechanicsburg, PA: Stackpole Books, 1995.
- Holborn, Hajo. "The Prusso-German School: Moltke and the Rise of the German General Staff" in Makers of Modern Strategy from Machiavelli to the Nuclear Age, ed. Peter Paret. Princeton University Press, 1986.
- Hooker, Richard D. ed. Maneuver Warfare: An Anthology. Novato, CA: Presidio Press, 1993.
- Howard, Michael E. War in European History. Oxford: Oxford University Press, 1976.
- Hughes, Daniel J. ed. Moltke on the Art of War. Novato, CA: Presidio Press, 1993.
- Leonhard, Robert. The Art of Maneuver Warfare, Novato, CA: Presidio Press, 1991.
- Lind, William S. The Theory and Practice of Maneuver Warfare. Boulder, CO: Westview Press Inc., 1985.
- Luttwak, Edward N. Strategy: The Logic of War and Peace. Cambridge, Massachusetts: The Belknap Press of Harvard University Press, 1987.
- McElwee, William. The Art of Warfare: Waterloo to Mons. Bloomington: Indiana University Press, 1974.
- Robertson, William. Soldiers and Statesmen: 1914-1918, Vol. I. New York: Charles Scribner's Sons, 1926.
- Rothenberg Gunther E. "Moltke, Schlieffen, and the Doctrine of Strategic Envelopment," in Makers of Modern Strategy from Machiavelli to the Nuclear Age, ed. Peter Paret, Princeton University Press, 1986.
- Simpkin, Richard E. Race to the Swift: Thoughts on Twenty-First Century Warfare. London: Brassey's Defence Publishers, 1985.
- Terraine, John. White Heat: The New Warfare 1914-1918. London: Sidgwick & Jackson, 1982.
- Toffler, Alvin and Heidi. War and Anti-War: Survival at the Dawn of the 21st Century. New York: Little Brown, and Co., 1993
- van Creveld, Martin with Steve L. Canby and Kenneth S. Bower. Air Power and Maneuver Warfare. Maxwell Airforce Base, AL: Air University Press, 1994.
- Von Clausewitz, Carl. On War. Edited and translated by Michael Howard and Peter Paret. Princeton, New Jersey: Princeton University Press, 1989.

Zabecki, David T. Steel Wind: Colonel George Bruchmuller and the Birth of Modern Artillery. Westport, CT: Praeger Publishers, 1994.

Thesis, Monographs & Reports

Abrams, Creighton. "Mobility versus Firepower." Art of War Colloquium, U.S. Army War College (February 1984): 93-108.

Carey, Mark G. "Forging Apollo's Golden Bow: Long Range Precision Fires in Future High Intensity Combat." Fort Leavenworth, Kansas: School of Advanced Military Studies Monograph, 1996.

Funk, David E. "Tactical Dislocation: Force XXI Doctrine or Just Another Pretty Theory?" Fort Leavenworth, Kansas: School of Advanced Military Studies Monograph, 1997.

Leonhard, Robert R. "Dislocation and FORCE XXI: A New Perspective on Commander's Intent." White Paper. Fort Monroe, Virginia: TRADOC Joint Venture Office, Undated.

Lupfer, Timothy. "The Dynamics of Doctrine: The Changes in German Tactical Doctrine during the First World War." Fort Leavenworth, KS: U.S. Army Command and General Staff College, July 1981.

Phillips, Gary E. "Some Thoughts On the Nature of Dominant Maneuver and Precision Engagement." Unpublished Paper, School of Advanced Military Studies, Fort Leavenworth, Kansas, 1997.

Schneider, James J. "Vulcan's Anvil: The American Civil War and the Emergence of Operational Art." Unpublished paper. Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Command and General Staff College, 1992.

Schroedel, Joseph. "The Art and Science of Operational Maneuver." Fort Leavenworth, Kansas: School of Advanced Military Studies Monograph, 1988.

Steffan, Grant. "Dominant Maneuver and Precision Engagement." Unpublished Paper, (FORSCOM J5, Fort McPherson, Georgia), 1997.

Swain, Richard M. "Filling the Void: The Operational Art and the U.S. Army," Fort Leavenworth, Kansas: U.S. Army Command and General Staff College.

Woods, Kevin S. "The Changing Application of Maneuver." Fort Leavenworth, Kansas: School of Advanced Military Studies Monograph, 1996.

Published Reports and Proceedings

- Hartzog, William W. Battle Labs: Defining the Future. Ft. Monroe, Va.: HQ TRADOC, May 1995.
- Simonds, Frank H. "Ardant du Picq," Preface to Battle Studies. Roots of Strategy, Book 2, Colonel John N. Greely and Major Robert C. Cotton trans. Harrisburg, Pennsylvania: Stackpole Books, 1987.
- Sullivan, Gordon R. and Anthony M. Coroalles. Seeing the Elephant: Leading America's Army into the Twenty-First Century. New Hampshire: Institute for Foreign Policy Analysis, 1995.
- Sullivan, Gordon R. and Togo D. West. Army Focus 94: Force XXI. Washington, D.C.: Government Printing Office, September 1994.

Periodicals & Articles

- Bowden, Scott. "Rethinking Defense," Independent Research and Information Services, Corp. 1997, Page. <<http://www.irisresearch.com/rethink4.htm>>.
- Bunker, Robert J. "Advanced Battlespace and Cybermaneuver Concepts: Implications for Force XXI." Parameters vol. 26, no. 3 (Autumn 1996): 108-119.
- Franz, Wallace P. "Maneuver: The Dynamic Element of Combat power." Military Review, vol. LXIII, no. 5, (May 1983) 2-12.
- Faugeron, General, "The Effects of Artillery Fire," The Field Artillery Journal, (Vol. XXII, Jan/Feb. 1932).
- Fogleman, Ronald R. "The Air Force and Joint Vision 2010." Joint Forces Quarterly. (Winter 96/97), pp. 24-28.
- Handel, Michael I. "Clausewitz in the Age of Technology." The Journal of Strategic Studies, vol. 9, no. 2 and 3, (June/September 1986): 51-92.
- McQuie, Robert. "Battle Outcomes: Casualty Rates as a measure of Defeat." Army (November 1987): 30-34.
- Reimer, Dennis J. "Dominant Maneuver and Precision Engagement." Joint Forces Quarterly. (Winter 96/97), pp. 13-16.
- Zais, Mitchell M., "Ardant du Picq: Unsung Giant of Military Theory," Army (April 1985): p. 58.

Military References and Publications

FMFM 1, Warfighting. Washington DC: 1989.

Joint Chiefs of Staff. Joint Pub 3-0: Doctrine for Joint Operations. Washington, DC: Government Printing Office, 1995.

"Joint Pub 1-02: DOD Dictionary of Military and Associated Terms." JCS Publications at "Joint Doctrine Publications Page." <<http://www.dtic.mil/doctrine/jel/doddict/data/m/03488.html>>.

Office of the Chairman, Joint Chiefs of Staff. National Military Strategy of the United States. Washington, DC: Government Printing Office, May 1997.

_____. Joint Vision 2010. Washington, DC: Government Printing Office, May 1996.

Office of the Secretary of Defense. A National Security Strategy for a New Century. Washington, DC: The White House, May 1997.

TRADOC PAMPHLET 525-5. Force XXI Operations: A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-first Century. Fort Monroe, Va.: HQTRS TRADOC, 1 August 1994.

_____. 525-200-2. Military Operations: Early Entry Lethality and Survivability Battle Dynamics Concept. Fort Monroe, Va.: HQTRS TRADOC, 1 March 1994.

U.S. Army. FM 71-100, Division Operations. Headquarters, Department of the Army, Washington, DC, 1990.

_____. FM 100-5, Operations. Headquarters, Department of the Army, Washington, DC, 1993.

_____. FM 100-15, Corps Operations. Headquarters, Department of the Army, Washington, DC, 1989.

U.S. Army War College. Artillery in Offensive Operations. Washington, DC: U.S. Government Printing Office, August 1917.

U.S. War Department. General Notes on the Use of Artillery. Washington, DC: U.S. Government Printing Office, 1917.